ISEMP COVER SHEET

Report information:

Title of Report: Preliminary site selection surveys for the South Fork Salmon River

Author (s): Chris Beasley and Rishi Sharma

Agency: Quantitative Consultants, Inc.

Report submittal date: 08 November 2006

Submitted to: Chris Jordan

Topic: Results of preliminary site selection surveys for ISEMP infrastructure proposed for the South Fork Salmon River.

File name: qcinc_sfsr_sitesurvey_20061107

Contract #: N/A

Basin: Columbia River Basin, Salmon Subbasin, South Fork Salmon River watershed.

Document Reference (see guidelines for format): Beasley, C. and Sharma, R. 2006. Preliminary site selection surveys for the South Fork Salmon River. Quantitative Consultants, Inc.

Author contact information:

Name: Chris Beasley

Agency: Quantitative Consultants, Inc.

Email: chris@qcinc.org

Phone: (360) 620-2883

Fax: N/A

Preliminary site selection surveys for the South Fork Salmon River

Introduction

The Integrated Status and Effectiveness Monitoring Project (ISEMP) seeks to implement a habitat and population status and trend monitoring project in the South Fork Salmon River (SFSR) watershed. A study design for this purpose was developed in 2005 (QCI 2003). The study design included a number of alternatives that would enable estimation of spring/summer Chinook salmon (*Oncorhynchus tshawytscha*) life-stage specific abundance, survival, and distribution at multiple spatial scales including the reach, population, and major population group. Likewise, the design sought to address data gaps relating to the life-stage specific abundance, survival, and distribution of putative steelhead (*O. mykiss*) populations inhabiting the mainstem SFSR and Secesh River (ICTRT 2005). In order to generate this information, the preferred study design relies on myriad existing projects and requires the deployment and operation of additional sampling infrastructure including:

- a juvenile and adult sampling and enumeration capability in the lower mainstem SFSR;
- an acoustic imaging camera in the lower Secesh River; and
- extended length PIT tag arrays located in the Secesh River, the East Fork SFSR (EFSFSR), and the mainstem SFSR above the confluence with the EFSFSR.

An alternative design also relies on myriad existing projects and requires the deployment and operation of additional sampling infrastructure including:

- adult enumeration facilities (i.e., acoustic imaging cameras) in each of the major tributaries (Secesh River, EFSFSR, and the mainstem SFSR above the confluence with the EFSFSR) as near as possible to their confluences with one another and
- extended length PIT tag arrays located in the Secesh River, the EFSFSR (EFSFSR), and the mainstem SFSR above the confluence with the EFSFSR.

The preferred and alternate designs return identical information; however, the preferred design requires fewer acoustic imaging cameras, and is thus more efficient. The alternate design was developed as a default, should the lower mainstem SFSR prove too large for the reliable operation of infrastructure. A survey of potential locations for this infrastructure was conducted on 17 and 18 October 2006.

Lower SFSR Adult and Juvenile Enumeration and Capture Facilities

We define the lower SFSR as that stretch of the mainstem SFSR below the confluence of the Secesh River. The lower SFSR is extremely remote, requiring access via aircraft or via a single road. From McCall, ID, driving time is approximately 2.5 hours with clear road conditions. Public access is generally limited to an approximately half mile long stretch of river adjoining the road. The Elk Creek bride is likely the best location for placement of infrastructure owing to ease of access, access to both sides of the river, and the presence of a fixed structure. At the bridge site, the river was approximately 165 feet in width at the time of survey (fall low flow; Figure 1). Based on the relic high water marks, presumably from spring 2006, the river was approximately 221 feet in width and an additional 10 feet in depth at high flow. Although there are no current gauge sites near

the bridge, a gauge was operated a substantial distance upstream near Warren, ID from 1931 to 1943. It is apparent from those records that the lower SFSR is marked by extreme fluctuations in flow, with possible discharge exceeding 23,000 cubic feet per second. Thus, we concluded that the operation of an adult and juvenile capture facility and PIT tag array in the lower SFSR is unlikely to be logistically feasible. However, it may be possible to operate an acoustic imaging camera at the bridge site, thus enabling adult escapement estimates.

Figure 1: Upstream view from atop the Elk Creek bridge on the lower SFSR. Note the high water marks on the banks.

Upper Mainstem SFSR

We define the upper mainstem SFSR as the area upstream of the confluence with the Secesh River. With the exception of Elk Creek, which is a tributary to the lower mainstem SFSR and believed to be a substantial production area for *O. mykiss*, the majority of *O. mykiss*, and spring/summer Chinook salmon production occurs in the upper mainstem SFSR and its major tributaries (the Secesh River and the East Fork SFSR). Under the alternative ISEMP design, a PIT tag array and an acoustic imaging camera would be located on the upper mainstem SFSR.

Unlike the lower SFSR, the upper SFSR id easily accessible for most of its length by a well maintained road. Also in contrast to the lower SFSR, the upper SFSR is much smaller, with maximum discharge of around 6,740 cubic feet per second recorded in 1974. We identified four locations that appeared conducive for the operation of a PIT tag array and acoustic imaging camera. Of the sites, the stretch of river adjoining the USGS Krassel gauge (Figure 2) is likely the best choice. The gauge station has a trolley, thus

affording access to both sides of the river, and the site itself is wide and less likely to exhibit dramatic changes in depth as discharge fluctuates.

Figure 2. The upper SFSR near the Krassel gauge.

Secesh River Site Surveys

The Secesh River is intensively monitored; ongoing projects provide adult spring summer Chinook salmon escapement estimates for the upper Secesh and Lake Creek. Likewise the abundance of juvenile spring/summer Chinook salmon is enumerated in Lake Creek and the upper Secesh River via the operation of rotary screw traps. The abundance of emigrating juvenile *O. mykiss* is estimated via the operation of a rotary screw trap in the lower Secesh River.

The ISEMP project hopes to capitalize on the wealth of existing infrastructure and information available in the Secesh River to validate and/or test alternative technologies and sampling locations (see QCI 2005). Thus site surveys in the Secesh River focused on identifying locations for an extended length PIT tag array and a Dual Frequency Identification Sonar (DIDSON) device. Three candidate sites were located on the lower Secesh River. The site nearest the existing lower Secesh River rotary screw trap appeared to be most conducive to the operation of both a PIT tag array and a DIDSON device (Figure 3). In addition, the close proximity of the sampling devices is anticipated to enable greater operational efficiency (e.g., a single field crew may be able to operate and maintain all three sampling devices).

Figure 3. Potential site for the operation of a PIT tag array and DIDSON device in the lower Secesh River.

East Fork SFSR Site Surveys

The majority of spring/summer Chinook salmon production in the East Fork SFSR (EFSFSR) occurs in Johnson Creek, and is currently monitored via the operation of a rotary screw trap and temporary picket weir. However, EFSFSR *O. mykiss* and mainstem EFSFSR spring/summer Chinook salmon production is not currently monitored. This production will be monitored using an acoustic imaging camera (e.g., DIDSON) and via the operation of a PIT tag array.

The lower EFSFSR passes through a canyon, thus it was challenging to find locations with site characteristics that were conducive for both a PIT tag array and an acoustic imaging camera. Three sites were located, and the site nearest the confluence with the mainstem SFSR (Figure 4) appeared to be the best candidate. Although nearly ideal for the operation of an acoustic imaging camera, the site will likely present a challenge for the reliable operation of a PIT tag array. Given the constricted nature of the EFSFSR, even relatively minor increases in discharge can have a dramatic influence on water depth and velocity.

Figure 4. Potential site for a PIT tag array and acoustic imaging camera on the mainstem EFSFSR.

Conclusions

The preliminary SFSR site survey suggested that the lower SFSR presents logistical challenges that significantly reduce the probability of successfully implementing the preferred ISEMP study design. However, the Elk Creek bridge site in the lower SFSR might be a useful location for an acoustic imaging camera. The preliminary site survey successfully identified sites in the upper SFSR and tributaries sufficient to implement the alternative ISEMP design, including the deployment of acoustic imaging cameras and PIT tag arrays (Table 1). However, final site selection will likely require that preliminary sites be revisited spring high flow conditions. Likewise, we recommend that the lower SFSR be aerially surveyed to determine conclusively whether sites exist that might enable the implementation of the preferred ISEMP study design.

Table 1. Locations of potential sites for ISEMP infrastructure and existing infrastructure in the SFSR. Preferred sites for ISEMP infrastructure are bolded.

Site	UTM		
	Zone	Easting	Northing
Potential Adult Enumeration Sites			
Secesh River - Ponderosa Campground	11	600626	4987336
Secesh River - Unnamed	11	601044	4985251
EFSFSR - Unnamed	11	606436	4979267
SFSR Mainstem - Near Secesh Confluence	11	601578	4986201
SFSR Mainstem - Krassel Gauge	11	600520	4982265
SFSR Mainstem - Campground	11	599739	4978330
SFSR Mainstem - Rotary Screw Trap Site	11	601044	4985186
SFSR Mainstem - Elk Creek Bridge	11	611480	5003195
Existing Adult Enumeration Sites			
Secesh River - Lake Creek Video Weir	11	586064	5012357
Secesh River - NPT DIDSON	11	593348	5007228
EFSFSR - Johnson Creek Picket Weir	11	619307	4973082
SFSR Mainstem - McCall Hatchery Weir	11	602888	4945501
Existing Rotary Screw Traps			
Secesh River - Lake Creek	11	586473	5012049
Secesh River - Chinook Campground	11	593412	5007404
EFSFSR - Johnson Creek	11	619706	4974920
SFSR Mainstem	11	602816	4946752
Potential PIT tag Array Sites			
Secesh River - Unnamed	11	601044	4985251
Secesh River - at SFSR confluence	11	601561	4986195
EFSFSR - Unnamed	11	604810	4875556
EFSFSR - Unnamed	11	605155	4978539
SFSR Mainstem - Unnamed	11	606436	4979621
SFSR Mainstem - Krassel Gauge	11	600520	4982265
SFSR Mainstem - Rotary Screw Trap Site	11	601044	4985186

Literature Cited

ICTRT. 2003. Independent populations of chinook, steelhead and sockeye for listed evolutionarily significant units (ESUs) within the interior Columbia basin. http://www.nwfsc.noaa.gov/trt/trt_columbia.htm.

QCI. Quantitative Consultants, Inc. 2005. Study design for habitat and population status and trend monitoring for the South Fork Salmon River, Idaho and habitat action effectiveness monitoring for the Lemhi River, Idaho. Prepared for National Oceanographic and Atmospheric Administration, Department of Fisheries, Northwest Fisheries Science Center. 61pp.